

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

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In the Matter of	)	
	)	
2000 Biennial Regulatory Review --	)	IB Docket No. 00-248
Streamlining and Other Revisions of Part 25 of	)	
the Commission's Rules Governing the Licensing	)	
of, and Spectrum Usage by, Satellite Network	)	
Earth Stations and Space Stations	)	
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**SURREPLY OF THE  
SATELLITE INDUSTRY ASSOCIATION  
TO THE REPLY COMMENTS OF  
TELESAT CANADA AND QUALCOMM INCORPORATED**

October 3, 2003

## INTRODUCTION AND SUMMARY

The Satellite Industry Association (“SIA”) hereby submits this Surreply in response to certain reply comments filed concerning the Further Notice of Proposed Rulemaking issued in the above-captioned proceeding.<sup>1</sup> In particular, SIA responds herein to the reply comments filed by: (1) Telesat Canada (“Telesat”) and (2) QUALCOMM Incorporated (“Qualcomm”). Telesat did not file comments in this proceeding and thus, introduced proposals for the first time in its reply comments. Although Qualcomm filed comments in this proceeding, certain proposals regarding contention protocols were modified in its reply comments. This Surreply addresses the proposals discussed for the first time by Telesat and Qualcomm in each commenter’s respective reply comments.<sup>2</sup> In addition, this Surreply responds to the recent *ex parte* filings of Qualcomm regarding contention protocols.<sup>3</sup>

### **I. THE COMMISSION SHOULD NOT APPLY KU-BAND OFF-AXIS ANGLE ANTENNA STANDARDS TO THE C-BAND AND THE KA-BAND**

In its Comments, SIA proposed that the Commission relax the antenna pattern requirements applicable to antennas that transmit in the 14.0 – 14.5 GHz band with dimensions in the GSO plane less than 1.2 meters to start at 1.5 degrees off-axis.<sup>4</sup> The proposed starting angle represents the industry’s consensus of transmit performance standards that are routinely met by many antennas with dimensions in the GSO plane less than 1.2 meters, such as 0.74m elliptical antennas (*i.e.*, antennas with dimensions of 98 cm by 56 cm having an equivalent diameter of 74 cm), without causing harmful interference. Thus, antennas with dimensions in the GSO plane less 1.2 meters that transmit in the 14.0-14.5 GHz band should be eligible for routine processing and should not be subject to additional regulation regarding pointing error.

Also, as discussed in the SIA Comments, the potential for interference is not in any way impacted by whether the receive pattern of an antenna meets the requirements of Sections 25.209(a) or 25.209(b). By their terms, the antenna gain pattern requirements of Sections 25.209(a) and 25.209(b) apply only to

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<sup>1</sup> See *In the Matter of 2000 Biennial Regulatory Review--Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, Further Notice of Proposed Rulemaking, 17 FCC Rcd 18585 (2002) (“FNPRM”).

<sup>2</sup> To the extent necessary, SIA requests leave to file this Surreply to the Reply Comments of Telesat and the Reply Comments of Qualcomm given that Telesat and Qualcomm each raised new issues in their respective reply comments.

<sup>3</sup> *Ex parte* letter of Qualcomm, IB Docket 00-248, dated July 30, 2003, filed with the Secretary’s office July 30, 2003, electronically filed September 5, 2003 (“Qualcomm September 5, 2003 *ex parte*”); *Ex parte* letter of Qualcomm, IB Docket 00-248, dated July 30, 2003, filed September 9, 2003 (“Qualcomm September 9, 2003 *ex parte*”).

the transmit pattern of an antenna. SIA urges the Commission to clarify that, for purposes of determining whether an antenna is eligible for routine processing, the receive pattern of that antenna is irrelevant. Thus, eligibility for routine processing should be based solely on whether the transmit pattern meets Sections 25.209(a) and 25.209(b). Receive protection for all earth stations should be based on Section 25.209(c) of the Commission's Rules.<sup>5</sup>

In its Reply Comments, Telesat supports the proposal of SIA to start the reference antenna gain pattern at 1.5 degrees off-axis for antennas transmitting in the 14.0-14.5 GHz band. Telesat agrees that SIA's proposal to start the antenna gain pattern at 1.5 degrees will achieve the objective of minimizing interference with satellites that are nominally spaced 2 degrees apart in the GSO arc.<sup>6</sup> However, Telesat proposes to extend this proposal to antennas transmitting in the C-band and the Ka-band.

SIA opposes applying the proposed Ku-band off-axis angle compliance standards to the Ka-band. As stated in SIA's Reply Comments, the Commission has already developed compliance standards for Ka-band systems, and any extension of proposed new rules to the Ka-band is unnecessary. Section 25.138 of the Commission's Rules provides appropriate service rules for the Ka-band.<sup>7</sup> Moreover, given that the first satellites are expected to be launched only this year and Ka-band licensees have been developing their networks based on the current rules, it is inappropriate to extend proposed new rules to the Ka-band. Thus, the Commission should not adopt the Telesat proposal to start the antenna gain pattern at 1.5 degrees for antennas transmitting in the Ka-band.

SIA also opposes applying the proposed Ku-band off-axis angle standard to the C-band. As explained in the SIA Comments, SIA is concerned that routine licensing of antennas with dimensions less than 4.5 meters in the C-band employing the maximum allowable power density into the antenna flange would degrade the system performance of large antennas used by cable head-end programming distribution services. If the power density is higher than  $-12\text{dBW}/4\text{kHz}$ , a 2.4 meter antenna with a pointing error greater than 0.6 degrees would cause more interference than a 4.5 meter antenna with a power density of  $-2.7\text{ dBW}/4\text{kHz}$ . Moreover, the power density actually used by C-band antennas with dimensions in the GSO plane smaller than 4.5 meters is much less than the maximum allowable power density into the antenna flange of  $-2.7\text{ dBW}/4\text{kHz}$  as currently provided in Section 25.212(d) of the Commission's Rules. Based on its analysis, SIA proposed that, for C-band antennas with dimensions in

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<sup>4</sup> Comments of the SIA at 2, 8, Appendix A proposed Section 25.209(a)(3)(iv) ("SIA Comments").

<sup>5</sup> SIA Comments at 2, 9.

<sup>6</sup> Reply Comments of Telesat at 2 ("Telesat Reply Comments").

<sup>7</sup> Reply Comments of the SIA at 11 ("SIA Reply Comments").

the GSO plane less than 4.5 meters and equal to or greater than 2.4 meters, the maximum power density into the antenna flange be limited to  $-12 \text{ dBW/4kHz}$ .<sup>8</sup>

Thus, SIA proposed that the Commission modify Section 25.212(d)(2) to routinely license antennas with dimensions in the GSO plane as small as 2.4 meters in the conventional C-band, for (i) narrowband analog carriers up to 200 kHz wide, provided that the maximum power spectral density into the antenna flange does not exceed  $-12 \text{ dB(W/4kHz)}$  and (ii) digital carriers, provided that the maximum power spectral density into the antenna flange does not exceed  $-12-10\log(N) \text{ dB(W/4kHz)}$ .<sup>9</sup> In addition, under SIA's proposal, applicants for 2.4-meter antenna licenses would be required to achieve antenna pointing accuracy, toward the desired satellite, within  $\pm 0.5^\circ$ , to prevent unacceptable interference into adjacent satellites.<sup>10</sup>

Further, SIA proposed that the antenna gain envelope starting angle should be less than 1.7 degrees for routine processing of antennas transmitting in the C-band with dimensions in the GSO plane less than 4.5 meters and greater than or equal to 2.4 meters. Any antennas that do not meet this antenna pattern starting angle criteria will be considered non-routine, and coordination of such operation by the target satellite operator with adjacent satellite operators will be required.<sup>11</sup> As noted by SIA, a typical 2.4 meter C-band antenna has a starting angle within 1.5-1.7 degrees off-axis.<sup>12</sup> Thus, Telesat's proposal to apply the proposed Ku-band off-axis starting angle of 1.5 degrees to the C-band would result in a more restrictive rule than that proposed by SIA. Moreover, Telesat's proposal does not take into account the need to also reduce the power level in order to alleviate interference concerns in the C-band. Thus, the Commission should not adopt Telesat's proposal to start the antenna gain pattern at 1.5 degrees for antennas transmitting in the C-band.

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<sup>8</sup> SIA Comments at 4-6.

<sup>9</sup> Where, in proposed Section 25.212(d)(1), N is defined as:

In the 6 GHz band, an earth station with an antenna dimension of 4.5 meters or greater in the geostationary satellite orbital plane may be routinely licensed for transmission of SCPC services if the maximum input power spectral densities into the antenna flange do not exceed  $+0.5 \text{ dB(W/4kHz)}$  for analog SCPC carriers with bandwidths up to 200 kHz and do not exceed  $-2.7 - 10\log(N) \text{ dB(W/4kHz)}$  for digital carriers.

(i) For digital transmissions using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

(ii) For digital transmissions using code division multiple access (CDMA) technique, N is the maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

<sup>10</sup> SIA Comments at 4-7, Appendix A proposed Section 25.212(d)(2); SIA Reply Comments at 3.

<sup>11</sup> SIA Comments at 7, Appendix A proposed Section 25.209(a)(4).

<sup>12</sup> SIA Comments at 7; *see also* SIA Reply Comments Figure 1.

## II. THE COMMISSION SHOULD NOT ADOPT TELESAT'S SUGGESTIONS REGARDING SMALL ANTENNAS

In its Reply Comments, Telesat suggests that a statement from the applicant that the antenna conforms with the envelope starting at 1.5 degrees should be sufficient for compliance except where the antenna dimension in the GSO plane is less than 3.0 meters, 1.2 meters and 0.6 meters in the 6 GHz, 14 GHz, and 30 GHz bands, respectively. In these “exception” cases, Telesat appears to suggest that the applicant should follow SIA’s proposed Section 25.209(f) and demonstrate that its earth station will not cause unacceptable interference in accordance with the procedures of SIA’s proposed Section 25.220(d)(2).<sup>13</sup> However, SIA did not propose that antennas with dimensions in the GSO plane less than 3.0 meters, 1.2 meters, and 0.6 meters in the 6 GHz, 14 GHz, and 30 GHz bands, respectively, should follow SIA’s proposed Section 25.209(f) or SIA’s proposed Section 25.220(d)(2).

SIA’s proposed Section 25.209(f) is expressly limited to earth stations with a transmitting antenna that does not conform to Sections 25.209(a) and 25.209(b). Section 25.209(f) further provides that an applicant with such a non-conforming antenna has the burden of demonstrating that its transmitting antenna will not cause unacceptable interference in accordance with the procedures of Section 25.220.<sup>14</sup> SIA’s proposed Section 25.220 is expressly limited to antennas proposed to operate in the C-band and/or the Ku-band in which the transmit portion of the antenna does not conform to the standards of Sections 25.209(a) and 25.209(b) and/or the transmit power density is in excess of the Commission’s Rules.<sup>15</sup>

Under SIA’s proposals, antennas with dimensions in the GSO plane less than 1.2 meters in the 14 GHz band that meet the antenna gain envelope starting at 1.5 degrees, and antennas with dimensions less than 4.5 meters and greater than or equal to 2.4 meters in the 6 GHz band that meet the antenna gain pattern starting at less than 1.7 degrees *are in compliance* with Sections 25.209(a) and 25.209(b).<sup>16</sup> As discussed above, an antenna transmitting in the Ku-band that meets the antenna gain pattern envelope at an off-axis angle of 1.5 degrees or less does not cause harmful interference.<sup>17</sup> Similarly, with the SIA’s proposed reduction in power density, antennas with dimensions less than 4.5 meters and greater than or equal to 2.4 meters transmitting in the C-band that meet the antenna gain pattern envelope at less than 1.7 degrees should not create any additional adjacent satellite interference if the antenna is aligned properly

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<sup>13</sup> Telesat Comments at 2-3.

<sup>14</sup> SIA Comments at Appendix A proposed Section 25.209(f).

<sup>15</sup> SIA Comments at Appendix A proposed Section 25.220.

<sup>16</sup> SIA Comments at 2, 7, 8, Appendix A proposed Section 25.209(a)(3)(iv) and proposed Section 25.209(a)(4).

<sup>17</sup> SIA Comments at 8.

towards the desired satellite.<sup>18</sup> Thus, an applicant with these antennas would not fall within the scope of Section 25.209(f) nor would such an applicant follow the procedures of Section 25.220.

As discussed above, the Commission has already developed compliance standards for Ka-band systems, and any extension of proposed new rules to the Ka-band is unnecessary.<sup>19</sup> The first Ka-band satellites are expected to be launched only this year and given that Ka-band licensees have been developing their networks based on the current rules, it is inappropriate to extend proposed new rules to the Ka-band. Moreover, Section 25.138 of the Commission's Rules provides appropriate service rules for the Ka-band.<sup>20</sup>

Telesat did not provide any support for its suggestions. Thus, the Commission should not adopt Telesat's unsubstantiated and unwarranted suggestions.

### **III. THE SIA PROPOSAL FOR REGULATING ANTENNA POINTING ERROR WILL ACHIEVE THE DESIRED ANTENNA POINTING ACCURACY**

In its Reply Comments, Telesat does not support SIA's proposal for regulating pointing error because Telesat believes that measuring the angular installation pointing error in practice is not practical.<sup>21</sup> However, SIA did not propose that the applicant measure the angular installation pointing error. Rather, SIA proposed that each applicant demonstrate that it can, using its own proprietary method, achieve the required limit on pointing error.<sup>22</sup> For example, one method is to maximize the cross polarization isolation on the transmit side of the remote antenna while monitoring at the hub antenna. This method takes advantage of the earth station antenna cross-polarization null at the antenna boresight direction. In the process, the applicant would identify the antenna cross-polarization level for the given maximum allowable pointing error. The applicant would demonstrate that the antenna would achieve the required cross-polarization isolation during the installation process.<sup>23</sup>

SIA's proposal for regulating pointing error is specifically for antennas operating in the 14 GHz band with dimensions in the GSO plane less than 1.2 meters where the transmit portion of the antenna meets the antenna gain envelope starting at an off-axis angle above 1.5 degrees and up to and including 1.8 degrees. An applicant with such an antenna would be required to submit either (i) a technical showing

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<sup>18</sup> SIA Comments at 7.

<sup>19</sup> SIA Reply Comments at 11.

<sup>20</sup> *Id.*

<sup>21</sup> Telesat Reply Comments at 3.

<sup>22</sup> See SIA Comments at 9 ("The antenna pointing error depends on the installation procedure, which is highly proprietary to the earth station licensee. Therefore the process of seeking a methodology for estimating pointing error may not be the correct approach since the level of detail in the installation process is a business decision and therefore very difficult to regulate.").

demonstrating how the required maximum pointing accuracy will be met during antenna installation (as discussed above) or (ii) a coordination agreement between the operator of the satellite with which the earth station will communicate and the satellite operators within two degrees of the target satellite. The required maximum antenna pointing error (pe) towards the desired satellite shall not exceed:

$$pe = 2 - x, \text{ degrees} \qquad 1.5 < x \leq 1.8$$

where x is the starting point of the antenna gain envelope of the antenna.<sup>24</sup>

#### **IV. THE COMMISSION SHOULD NOT ADOPT QUALCOMM'S REVISED PROPOSALS REGARDING CONTENTION PROTOCOLS**

SIA demonstrated in its initial Comments that there is no need for the Commission to adopt regulations regarding contention protocols for FDMA, TDMA or CDMA. As stated in SIA's Comments and Reply Comments, it is unnecessary to impose a power reduction requirement for Aloha access techniques.<sup>25</sup> Hundreds of thousands of VSAT terminals using Aloha access have been deployed over the last twenty years without causing harmful interference to adjacent satellite systems. In fact, as the number of terminals increases, there have been no corresponding incidents of harmful interference.<sup>26</sup>

SIA observed in its Comments and Reply Comments that the Commission is concerned with the possibility of harmful interference to adjacent satellite systems and proposed the adoption of regulations regarding the use of contention protocol systems. SIA does not support the adoption of regulations to address an issue that does not yet exist (and, with advances in satellite technology, may never materialize). However, should the Commission proceed to impose regulations governing contention protocols, SIA proposed the following modification that could replace parts (i), (ii) and (iii) of the rules proposed by the Commission in paragraph 90 of the FNPRM:<sup>27</sup>

The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station shall not exceed  $-14-10\log(N)$  dB(W/4kHz), where N is an integer. The number N is defined such that, during any 100 millisecond interval, the probability that  $Q > N \cdot 100$  milliseconds is less than 0.01, where Q = the accumulated transmission time of all co-frequency simultaneously transmitting earth stations in the

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<sup>23</sup> SIA Comments at 13.

<sup>24</sup> SIA Comments at 11-12, Appendix A proposed Section 25.220(d)(2).

<sup>25</sup> See SIA Comments at 18; SIA Reply Comments at 5.

<sup>26</sup> See Spacenet/Starband Comments at 6 ("As VSAT networks have rapidly expanded, particularly during the past decade, there have been no reported incidents of harmful or unacceptable interference caused by the random access techniques . . . ."); SIA Reply Comments at 6.

<sup>27</sup> See SIA Comments at 18-20. The Commission could insert this rule revision under Section 25.134(a)(1)(iii); see also SIA Reply Comments at 5-6.

same satellite receiving beam. The maximum duration of any single collision is less than 100 milliseconds.

As discussed in SIA's Comments and Reply Comments, this alternative conforms to the Commission's determination that the probability of collision in a VSAT network with 100 millisecond transmissions should be limited to less than 1 percent. As in the Commission's proposal, the offered load in a network with 100 millisecond transmissions would be controlled so that the probability of collision between any two transmissions is less than 1 percent. However, the SIA alternative allows additional flexibility for systems with bursts of duration less than 100 milliseconds. Different VSAT networks are designed with different fundamental transmission durations. A VSAT network with shorter duration transmissions will create shorter duration collisions. These shorter duration collisions will not have the same effect as a collision between two 100 millisecond bursts. Thus, the offered load in a network with shorter duration collisions would not need to be as restricted as a network with longer duration collisions.<sup>28</sup>

Moreover, without the additional flexibility provided in the SIA alternative, VSAT networks using shorter transmission times would be disadvantaged relative to networks using longer transmission times. The SIA alternative addresses the differences between VSAT networks and provides a technology neutral solution. SIA continues to maintain its position that the Commission should not adopt regulations governing contention protocols and has proposed this alternative only in the event the Commission imposes such regulations.<sup>29</sup>

The Commission should not adopt the revised proposals of Qualcomm regarding contention protocols. In its Reply Comments, Qualcomm further restricts the offered load in a network through a reduction in the probability of collisions to 0.1% rather than the 1% probability in the Commission's proposal and in the SIA alternative (if the Commission should proceed to impose regulations).<sup>30</sup> This proposal is unnecessary and unwarranted. As discussed above, SIA strongly believes that there is no need for any regulation regarding random access techniques. There have been no demonstrated cases of harmful interference to adjacent satellite networks attributable to random access techniques. Yet, Qualcomm has proposed a more restrictive regulation without providing any basis for the additional restriction. Qualcomm has not provided any evidence or analysis to support its proposal to reduce the probability of collisions by an arbitrary factor of ten. The Commission should not adopt the unsubstantiated proposal of Qualcomm.

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<sup>28</sup> SIA Comments at 19; SIA Reply Comments at 6.

<sup>29</sup> SIA Comments at 19; SIA Reply Comments at 6-7.

<sup>30</sup> Reply Comments of Qualcomm at 3 ("Qualcomm Reply Comments").



The Commission also should not adopt the revised proposal of Qualcomm to permit a transmission duration of one second rather than the 100 millisecond duration in the Commission's proposal and in the SIA alternative (in the event the Commission should impose regulations). Qualcomm claims that a transmission duration of one second would not cause unacceptable interference. Qualcomm also claims that outages of up to one second (caused by interferer power exceedence) are likely to be acceptable.<sup>31</sup> SIA does not agree. SIA believes that such levels of transmission duration would cause unacceptable interference. SIA also believes that outages of one second are not acceptable for the provision of quality service to the end user. If the Commission should proceed to impose regulation regarding contention protocols, the SIA alternative is designed to provide and maintain a viable service for networks with shorter duration collisions and will not cause any increase in interference to adjacent satellite networks.

Moreover, contrary to Qualcomm's assertions, its statistical approach is not technology neutral.<sup>32</sup> As discussed in SIA's Reply Comments, the Qualcomm proposal is applicable only to contention protocol CDMA systems. The proposal would not be applicable to reservation type systems such as TDMA, FDMA, and non-random access CDMA. For example, TDMA uses narrow bandwidth on multiple shared carriers whereas contention protocol CDMA systems operate over the entire bandwidth. Thus, the application of statistical techniques to the relatively few random access channels in a TDMA network will permit transmission collisions only on these few channels. In contrast, the application of statistical techniques to networks using contention protocol CDMA systems will permit transmission collisions over the entire bandwidth. The Qualcomm proposal would place TDMA, FDMA, and non-random access CDMA systems at a disadvantage to contention protocol CDMA systems.<sup>33</sup>

Qualcomm claims that "[s]ome TDMA systems are broadband (and use the full assigned bandwidth)."<sup>34</sup> However, not *all* TDMA systems use the full assigned bandwidth. Thus, as stated above, those TDMA systems that use narrow bandwidth on multiple shared carriers will be at a disadvantage to contention protocol CDMA systems under Qualcomm's statistical approach. Again, contrary to its assertions, Qualcomm's proposal is not technology neutral.

Qualcomm suggests that an applicant would demonstrate compliance with its statistical approach either by a paper showing, by checking a box on the application, or by maintaining a log of power readings that would be available for inspection by the Commission.<sup>35</sup> As discussed above, SIA strongly

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<sup>31</sup> Qualcomm Reply Comments at 4-5; Qualcomm September 5, 2003 *ex parte* at 25.

<sup>32</sup> See Qualcomm Comments at 3; see also Qualcomm September 5, 2003 *ex parte* at 25.

<sup>33</sup> SIA Reply Comments at 7.

<sup>34</sup> Qualcomm September 5, 2003 *ex parte* at 31 (emphasis added).

<sup>35</sup> Qualcomm September 9, 2003 *ex parte* at 1.

believes that there is no need for any regulations governing contention protocols. However, should the Commission proceed to impose such regulations, the applicant should be able to demonstrate compliance by checking a box on the application affirming that the applicant will comply with the rules. As stated by Qualcomm, this is the current procedure used on the Form 312,<sup>36</sup> and SIA believes this is the most efficient manner to demonstrate compliance (in the event the Commission should impose regulations). Either a paper showing or the maintenance of a log of power readings would be unnecessary, and would be burdensome to the applicant/licensee and to Commission staff.

As discussed in SIA's Reply Comments, SIA also opposes Qualcomm's proposal to extend any regulations adopted regarding contention protocols to the Ka-band.<sup>37</sup> As discussed above, the first Ka-band satellites are expected to be launched only this year. Thus, it is premature to layer any additional regulations on the operation of these nascent networks without any basis for the new regulations.<sup>38</sup> As the Commission stated in the FNPRM, given the current state of development of Ka-band VSAT systems and the relative volume of traffic compared to Ku-band VSAT systems, the Commission is not concerned about the effect of contention protocol random access techniques on Ka-band VSAT transmissions. SIA agrees with the Commission's determination that if any regulations are adopted regarding contention protocols, those regulations should not be extended to the Ka-band.<sup>39</sup> For all of the foregoing reasons, the Commission should not adopt the revised proposals of Qualcomm.

## CONCLUSION

For the reasons stated herein and in its initial Comments and Reply Comments, SIA respectfully requests that the Commission revise Part 25 of its rules in the manner that SIA has proposed.

Respectfully submitted,

SATELLITE INDUSTRY ASSOCIATION

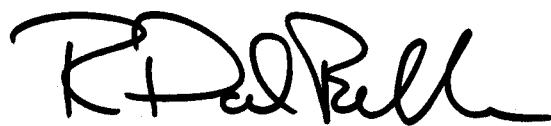
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<sup>36</sup> *Id.*

<sup>37</sup> See Qualcomm Comments at 2, 4.; Qualcomm Reply Comments at 1-5; *see also* SIA Reply Comments at 8.

<sup>38</sup> See SIA Comments at 20.

<sup>39</sup> See FNPRM at ¶103.

A handwritten signature in black ink, appearing to read "R DalBello". The signature is stylized with a large, looped "R" and a cursive "DalBello".

By: \_\_\_\_\_

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